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None

(58) Field of search

H5H

H2H

(54) Radiant heating means

(57) In a radiant heating means wherein the glowing of the heating coil 1 is visible through a hot-plate, a PTC resistor 7 is connected in parallel with one section 6 of the heating coil 1 in such a manner as to achieve a glow quickly after switching in. The cold resistance value of the PTC resistor is considerably lower than the resistance value of this section 6.

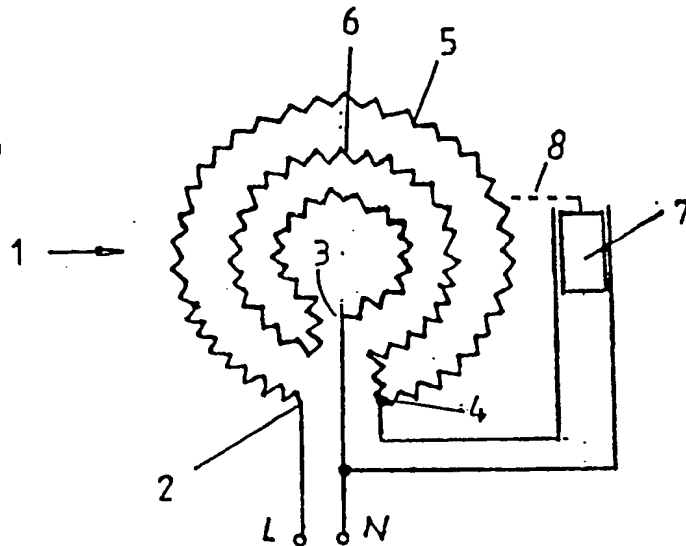


Fig. 1

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Fig.1

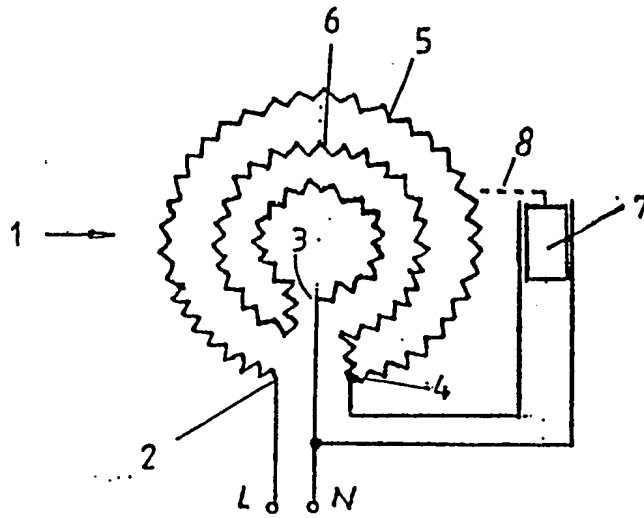
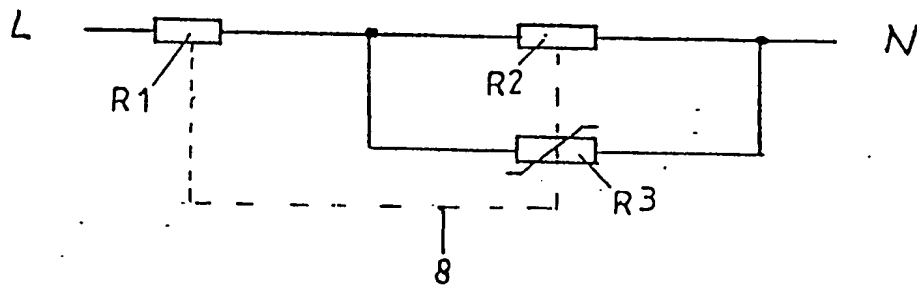


Fig.2



SPECIFICATION

Radiant heating means

- 5 This invention relates to a radiant heating means and more especially to a radiant heating means having a heating coil the glowing of which is visible through a hot-plate and in which the heating coil is divided into sections.
- 10 In known radiant heating means, the heating coil is made up of resistance wire and divided into sections in order to enable cooking with different powers.
- After the radiant heating means has been
- 15 switched on, the heating coil gradually warms up until it glows visibly. For the user, a comparatively long time elapses, after switching on, before he obtains an optical indication that the radiant heating means is working properly.
- 20 This optical indication occurs when the user sees the glowing of the heating coil through the hot-plate, particularly a ceramic hot-plate.
- In DE-PS 29 51 410, a signalling device for ceramic hot-plates is described which comprises its own signalling member which is operated by a switch thermally coupled to the hot-plate. In this case it is necessary that the signalling member should switch on without delay so that the user is warned in good time
- 30 that the temperature is too high for the hot-plate to be touched. For such a temperature responsive switch a pilot heating means having a PTC resistor (a thermally responsive resistor with a positive temperature coefficient) and a heat-storage member is provided. The PTC resistor heats the switch and the heat-storage member. A similar signalling device is described in DE-OS 29 51 409.
- It is an object of the invention to provide a
- 40 radiant heating means of the kind initially referred to wherein glowing is rapidly visible after switching on.
- The present invention provides a radiant heating means having a heating coil, the glowing of which is visible through a hot-plate, and which is divided into sections, wherein there is connected in parallel with one section of the heating coil a PTC resistor the cold resistance value of which is considerably lower
- 50 than the resistance value of said section.
- As a result of the present invention, when the cold heating coil is switched on, one section of the heating coil is short-circuited while a correspondingly higher current flows through
- 55 another section causing this latter section to begin to glow rapidly. Thus the user recognises the desired operating state of the radiant heating means very quickly after switching on.
- 60 As the current flows the PTC resistor warms up as a result of which its resistance value increases above the resistance value of the section with which it is connected in parallel. As a result, this section now also comes
- 65 into operation so that the whole heating coil is

effective.

Another advantage of the present invention is that neither a separate signalling device nor an electro-mechanical switch is necessary.

- 70 In a preferred embodiment of the invention, the PTC resistor is thermally coupled to the radiant heating means. As result the resistance value of the PTC resistor is also increased by the heat developed by the section with which it is connected in series.

- 75 Further advantageous developments of the invention can be seen from the sub-claims and one particular embodiment of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 shows a diagrammatic arrangement of a radiant heating means, and

Figure 2 shows an electrical circuit diagram of the radiant heating means.

- 85 Referring now to Fig. 1, a heating coil of resistance wire extends spirally under a hot-plate, (not illustrated) of glass ceramic. The ends 2, 3 of the heating coil 1 are connected to poles (L, N) of a switching device (not illustrated).

- 90 A tap 4 is provided on the heating coil 1. Extending between the end 2 and the tap 4 is an outer section 5 which is substantially annular. Extending between the tap 4 and the end 3 is an inner section 6 of the heating coil 1. A PTC resistor 7 is connected to the inner end 3 and the tap 4. A PTC resistor of the type A 195 (Siemens) may be used, for example, which has a cold resistance of 3.3 ohms and a hot resistance of 10 kOhm. The PTC resistor 7 is connected in parallel with the inner section 6, the resistance of which may, for example be 10 to 15 ohms.

- The PTC resistor 7 is spatially arranged so that there is a thermal coupling 8 between it and the heating coil 1. For the thermal coupling 8, the PTC resistor 7 may also be connected to the hot-plate by means of a heat-conducting metal sheet, (not illustrated). The heat-conducting metal sheet may be part of the mechanical holder of the PTC resistor.

- The section 5 has a resistance R1. The section 6 has a resistance R2. The resistance of the PTC resistor 7 is designated by R3 (see Fig. 2). The resistance R3 is connected in parallel with the resistance R2 and in series with the resistance R1. The resistance R1 amounts, for example, to a third of the total resistance R1+R2 of the heating coil 1. The cold resistance value of the resistance R3 is considerably lower than the resistance R2. The hot resistance value of the resistance R3 is considerably greater than the resistance R2.

- When the cold radiant heating means is
- 125 switched on, the resistance R3 practically short-circuits the resistance R2 so that a comparatively high current flows through the resistance R1. The section 5 thus begins to glow visibly very quickly. Sensible heat is radiated through the hot-plate. At the same time, the

PTC resistor 7 or R3 heats up so that it becomes highly resistive. As a result, the resistance R2 of the inner section 6 becomes ineffective. The resistance R3 is now practically ineffective. The heating coil 1 is working with its full power. The usual temperature control is effected via a switching device (not illustrated).

So long as the radiant heating means is hot, the PTC resistor 7 or R3 remains highly resistive even in the event of a brief interruption in the mains supply. If the radiant heating means is semi-warm, the resistance R3 reaches a value at which the resistance R2 is also effective, correspondingly quicker.

As a result of the PTC resistor 7 or R3, a current surge is produced in the section 5 after the radiant heating means is switched on and the section 5 thus works briefly with increased power.

CLAIMS

1. A radiant heating means having a heating coil, the glowing of which is visible through a hot-plate, and which is divided into sections, wherein there is connected in parallel with one section of the heating coil a PTC resistor the cold resistance value of which is considerably lower than the resistance value of said section.

2. A radiant heating means as claimed in Claim 1, wherein the hot resistance value of the PTC resistor is substantially higher than the resistance value of the said section with which it is connected in parallel.

3. A radiant heating means as claimed in Claim 1 or 2, wherein the PTC resistor is thermally coupled to the radiant heating means.

4. A radiant heating means as claimed in Claim 3, wherein the PTC resistor is disposed close to the heating coil.

5. A radiant heating means as claimed in Claim 4, wherein the PTC resistor is disposed close to the said section with which it is connected in series.

6. A radiant heating means as claimed in any one of the preceding Claims, wherein the PTC resistor is connected to the hot-plate by means of a heat-conducting metal sheet.

7. A radiant heating means as claimed in Claim 6, wherein the heat-conducting metal sheet is part of the mechanical holder of the PTC resistor.

8. A radiant heating means as claimed in any one of the preceding Claims, wherein the PTC resistor is connected in parallel with the inner section of a heating coil laid in the form of a spiral.

9. A radiant heating means substantially as hereinbefore described and with reference to the accompanying drawings.

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